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APPLICATION FOR LETTERS PATENT

TITLE: COMMUNICATION CONTROL APPARATUS,  
COMMUNICATION APPARATUS, COMMUNICATION  
SYSTEM, AND METHOD OF THE SAME

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COMMUNICATION CONTROL APPARATUS, COMMUNICATION APPARATUS,  
COMMUNICATION SYSTEM, AND METHOD OF THE SAME

BACKGROUND OF THE INVENTION

5           1.    Field of the Invention

          The present invention relates to a  
communication control apparatus, communication apparatus,  
and communication system used for communication among a  
plurality of points via communication lines and a method  
10 of the same.

          2.    Description of the Related Art

          In recent years, due to advances in  
communication and computer technology, it has become  
possible for users to engage in multipoint communication  
15 (party communication) for communication with a plurality  
of users by connecting a camera and microphone to a  
personal computer at home without purchasing a large  
scale expensive system like a television conference  
system and by transferring images and sounds in real time  
20 between a plurality of personal computers via a network.

          When a service provider of such a multipoint  
communication provides this service, there is a demand  
for developing a system which is user friendly and  
convenient for the service provider in business.

25           The present invention was made in consideration

with the above disadvantages of the related art and has  
as an object thereof to provide a communication control  
apparatus, communication apparatus, and communication  
system friendly to users of multipoint communication and  
5 a method thereof.

#### SUMMARY OF THE INVENTION

An object of the present invention is to provide a  
communication control apparatus, communication apparatus,  
10 and communication system convenient for a service  
provider of multipoint communication in business and a  
method thereof.

To solve the above problem of the related art and  
achieve the above object, the communication control  
15 apparatus of a first aspect of the present invention is a  
communication control apparatus for controlling  
multipoint communication using a plurality of  
communication apparatuses connected via communication  
lines, comprising a control means for controlling  
20 communication so as to transit signals received from the  
plurality of communication apparatuses and a signal for  
providing predetermined advertising information to the  
plurality of communication apparatuses.

According to a first aspect of the present  
25 invention, there is provided a communication control

apparatus receives signals from the plurality of communication apparatuses.

Then, the control means of the communication control apparatus controls communication to transmit the signals  
5 received from the plurality of communication apparatuses and a signal for providing predetermined advertising information to the plurality of communication apparatuses.

As a result, the plurality of communication  
10 apparatuses display etc. common advertising information together with the display etc. in accordance with the signals for multipoint communication.

Also, in the communication control apparatus of the first aspect of the present invention, preferably the  
15 control means controls communication so that the communication apparatuses display images in accordance with the signals received from the plurality of communication apparatuses and an image in accordance with the signal for providing the predetermined advertising  
20 information on one screen.

Further, in the communication control apparatus of the first aspect of the invention, preferably the control means determines the type of advertising information to be provided in accordance with an instruction from a  
25 communication apparatus and controls communication so as

to transmit a signal for providing the determined type of the advertising information to the communication apparatuses.

Further, in the communication control apparatus of  
5 the first aspect of the invention, preferably the control means assigns a predetermined selection right to a communication apparatus and allows the communication apparatus assigned the selection right to give the instruction.

10 Further, in the communication control apparatus of the first aspect of the invention, preferably the control means changes the communication apparatus assigned the selection right in accordance with a request from a communication apparatus.

15 Further, in the communication control apparatus of the first aspect of the invention, preferably the control means transmits a signal for a display for specifying the communication apparatus assigned the selection right to the plurality of communication apparatuses.

20 Further, in the communication control apparatus of the first aspect of the invention, preferably the control means determines whether or not to transmit a signal for providing the advertising information in accordance with an instruction from a communication apparatus.

25

Further, in the communication control apparatus of the first aspect of the invention, preferably the signals received from the communication apparatuses are signals for displaying faces of users of the communication apparatuses.

Further, in the communication control apparatus of the first aspect of the invention, preferably the control means controls communication so that a communication apparatus displays a second image in accordance with the predetermined advertising information larger compared with first images in accordance with signals received from the plurality of communication apparatuses.

Further, in the communication control apparatus of the first aspect of the invention, preferably the control means controls communication so that the second image is displayed below the first images in a display screen of the communication apparatus.

Further, the communication control apparatus of the first aspect of the invention preferably further comprises a charging means for determining fees to be charged to users of the communication apparatuses for use of the multipoint communication in accordance with provision of the advertising information.

Further, in the communication control apparatus of the first aspect of the invention, preferably the control

means controls communication so as to transmit sound signals received from the plurality of communication apparatuses to the plurality of communication apparatuses.

5       According to a second aspect of the present invention, there is provided a communication control apparatus for controlling multipoint communication performed using a plurality of communication apparatuses connected via communication lines, comprising a control  
10 means for controlling communication so as to transmit signals received from the plurality of communication apparatuses and a content signal specified by a communication apparatus to the plurality of communication apparatuses.

15       The action of the communication control apparatus according to the second aspect of the present invention is as follows.

      The communication control apparatus receives signals from the plurality of communication apparatuses.

20       Then, the control means of the communication control apparatus controls communication to transmit the signals received from the plurality of communication apparatuses and a content signal specified by a communication apparatus to the plurality of communication apparatuses.

25       As a result, the plurality of communication

apparatuses display etc. common content as well as a display etc. in accordance with signals for multipoint communication .

Further, in the communication control apparatus of  
5 the second aspect of the invention, preferably the control means controls communication so that the communication apparatuses display images in accordance with the signals received from the plurality of communication apparatuses and an image in accordance with  
10 the content signal on one screen.

Further, in the communication control apparatus of the second aspect of the invention, preferably the control means assigns a predetermined selection right to a communication apparatus and allows the communication  
15 apparatus assigned the selection right to designate the content signal.

Further, in the communication control apparatus of the second aspect of the invention, preferably, when the signals received from the plurality of communication  
20 apparatuses are sound signals, the control means recognizes sounds indicated by the sound signals and controls communication so as to transmit signals indicating the recognized sounds by text to the plurality of communication apparatuses.

25 According to a third aspect of the present



invention, there is provided a communication control apparatus for transmitting signals for displaying images to a communication apparatus, comprising a control means for transmitting to the communication apparatus  
5 information for controlling communication so as to display a plurality of images at positions on a screen of a display means of the communication apparatus corresponding to an arrangement of a plurality of operation buttons of an operation means of the  
10 communication apparatus and signals for displaying the plurality of images.

Further, in the communication control apparatus of the third aspect of the invention, preferably, when receiving an operation signal of an operation button of  
15 the communication apparatus, the control means transmits to the communication apparatus an image relating to an image corresponding to the operation button specified by the operation signal.

Further, in the communication control apparatus of  
20 the third aspect of the invention, preferably the control means controls communication so that information indicating correspondence of the plurality of operation buttons and the plurality of images is displayed on the display means of the communication apparatus.

25 Further, in the communication control apparatus of

the third aspect of the invention, preferably the control means controls multipoint communication performed using a plurality of communication apparatuses connected via communication lines.

5       According to a four aspect of the present invention, there is provided a communication apparatus for multipoint communication with a plurality of other communication apparatuses via communication lines, comprising a receiving means for receiving first signals  
10       transmitted by the plurality of other communication apparatuses and a second signal indicating predetermined advertising information and a signal processing means for processing for simultaneously displaying images in accordance with the first signals and an image in  
15       accordance with the second signal.

      According to a fifth aspect of the present invention, there is provided a communication apparatus for multipoint communication with a plurality of other communication apparatuses via communication lines,  
20       comprising a receiving means for receiving first signals transmitted by the other plurality of communication apparatuses and a second signal of a content designated by the communication apparatus; a display means; and a signal processing means for simultaneously displaying by  
25       the display means images in accordance with the first

signals and an image in accordance with the second signal.

According to a sixth aspect of the present invention, there is provided a receiving means for  
5 receiving signals of a plurality of images together with display position instruction information; an operation means comprising a plurality of operation buttons; a display means; and a signal processing means for signal processing so that the plurality of images are displayed  
10 at positions on a screen of the display means corresponding to an arrangement of the plurality of operation buttons based on the display position instruction information.

Further, in the communication apparatus according to  
15 the sixth aspect of the invention, preferably the signal processing means displays information indicating correspondence of the plurality of operation buttons and the plurality of images on the display means based on the display position instruction information.

20 According to a seventh aspect of the present invention, there is provided a communication system for multipoint communication using a plurality of communication apparatuses via communication lines under control by a communication control apparatus, wherein the  
25 communication control apparatus comprises a control means

for controlling communication so as to transmit first  
signals received from the plurality of communication  
apparatuses and a second signal for providing  
predetermined advertising information to the plurality of  
5 communication apparatuses; and the communication  
apparatus comprises a display means and a signal  
processing means for processing so as to display images  
in accordance with the first signals and an image in  
accordance with the second signal on one screen by a  
10 display means.

According to a eighth aspect of the present  
invention, there is provided a communication system for  
multipoint communication using a plurality of  
communication apparatuses via communication lines under  
15 control by a communication control apparatus, wherein the  
communication control apparatus comprises a control means  
for controlling communication so as to transmit first  
signals received from the plurality of communication  
apparatuses and a second signal of a content designated  
20 by the communication apparatus to the plurality of  
communication apparatuses; and the communication  
apparatus comprises a display means and a signal  
processing means for processing so as to display images  
in accordance with the first signals and an image in  
25 accordance with the second signal on one screen by a

display means.

According to a ninth aspect of the present invention, there is provided a communication system for multipoint communication using a plurality of

5 communication apparatuses via communication lines under control by a communication control apparatus, wherein the communication control apparatus comprises a control means for transmitting display position instruction information and signals of a plurality of images to the communication

10 apparatus; and the communication apparatus comprises an operation means comprising a plurality of operation buttons; a display means; and a signal processing means for signal processing so as to display the plurality of images in accordance with signals received from the

15 communication control apparatus at positions on a screen of the display means corresponding to an arrangement of the plurality of operation buttons based on the display position instruction information received from the communication control apparatus.

20 According to a 10th aspect of the present invention, there is provided a communication method for controlling multipoint communication using a plurality of communication apparatuses connected via communication lines, including the step of controlling communication so

25 as to transmit signals received from the plurality of

communication apparatuses and a signal for providing predetermined advertising information to the plurality of communication apparatuses.

Further, a communication method of a 10th aspect of the invention preferably includes the step of controlling communication so that the communication apparatuses display images in accordance with signals received from the plurality of communication apparatuses and an image in accordance with the signal for providing the predetermined advertising information on one screen.

According to a 11th aspect of the present invention, there is provided a communication method for controlling multipoint communication using a plurality of communication apparatuses connected via communication lines, including the step of controlling communication so as to transmit signals received from the plurality of communication apparatuses and a content signal designated by a communication apparatus to the plurality of communication apparatuses.

According to a 12th aspect of the present invention, there is provided a communication method for transmitting a signal for displaying an image to a communication apparatus, including the step of transmitting to the communication apparatus information for controlling communication so as to display a plurality of images at

positions on a screen of a display means of the communication apparatus corresponding to an arrangement of a plurality of operation buttons of an operation means of the communication apparatus and signals for displaying  
5 the plurality of images.

According to a 13th aspect of the present invention, there is provided a communication control apparatus for controlling multipoint communication using a plurality of communication apparatuses connected via communication  
10 lines, comprising a control means for controlling communication so as to transmit first signals indicating pickup results of faces of users of the communication apparatuses received from the plurality of communication apparatuses and second signals indicating pickup results  
15 in the directions of the users' perspectives to the plurality of communication apparatuses.

Further, in the communication control apparatus according to the 13 aspect of the invention, preferably the control means controls communication so that first  
20 images in accordance with the first signals and second images in accordance with the second signals are displayed in correspondence on one screen by the display means of the communication apparatus.

According to a 14th aspect of the present invention,  
25 there is provided a communication apparatus for

multipoint communication with a plurality of other communication apparatuses via communication lines, comprising a receiving means for receiving signals; a display means for display in accordance with the received signals; a first image pickup means for picking up an image of a face of a user of the communication apparatus; a second image pickup means for picking up an image in the direction of the user's perspective; and a transmission means for transmitting signals indicating the image pickup results of the first image pickup means and the second image pickup means.

Further, a communication apparatus according to a 14th aspect of the invention, preferably the display means displays first images in accordance with image pickup results of faces of users of the plurality of other communication apparatuses and second images in accordance with image pickup results in the directions of the users' perspectives.

Further, in the communication apparatus according to the 14th aspect of the invention, preferably the display means displays the first images and the second images in correspondence on one screen.

According to a 15th aspect of the present invention, there is provided a communication method for controlling multipoint communication using a plurality of



communication apparatuses connected via communication lines, including the step of controlling communication so as to transmit first signals indicating image pickup results of faces of users of the communication apparatuses received from the plurality of communication apparatuses and second signals indicating image pickup results in the directions of the users' perspectives to the plurality of communication apparatuses.

Further, the communication method according to a 15th aspect of the invention includes the step of controlling communication so that first images in accordance with the first signals and second images in accordance with the second signals are displayed in correspondence on one screen in the display means of the communication apparatuses.

#### BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects and features of the present invention will become clearer from the following description of the preferred embodiments given with reference to the accompanying drawings, in which:

Fig. 1 is a view of the configuration of a multipoint communication system according to a first embodiment of the present invention;

Fig. 2 is a view of the appearance of the front of a

multipoint communication terminal apparatus shown in Fig. 1;

Fig. 3 is a view of the configuration of the multipoint communication terminal apparatus shown in Fig.

5 1;

Fig. 4 is a flow chart of processing for selecting common content performed in the multipoint communication terminal apparatus when displaying a common commercial or other content on displays of a plurality of multipoint communication terminal apparatuses participating in multipoint communication shown in Fig. 1;

Fig. 5 is a block diagram of functions of an MCU shown in Fig. 1;

Fig. 6 is a flow chart of processing for selecting common content performed in the MCU when displaying a common commercial or other content on displays of a plurality of multipoint communication terminal apparatuses participating in multipoint communication shown in Fig. 1;

20 Figs. 7A to 7D are views for explaining display formats of the display of the multipoint communication terminal apparatus shown in Fig. 1;

Figs. 8A to 8D are views for explaining display formats of the display of the multipoint communication terminal apparatus shown in Fig. 1;

25

Figs. 9A to 9D are views for explaining display formats of the display of the multipoint communication terminal apparatus shown in Fig. 1;

5 Figs. 10A to 10C are views for explaining display formats of the display of the multipoint communication terminal apparatus shown in Fig. 1;

Fig. 11 is a view of the configuration of a multipoint communication system according to a second embodiment of the present invention.

10 Fig. 12 is a view of the appearance of the front of a cellular phone shown in Fig. 11;

Figs. 13A to 13D are views for explaining an example of a display format of a display of the cellular phone shown in Fig. 12;

15 Figs. 14A and 14B are views for explaining a method of selection of an image block in the cellular phone shown in Fig. 12;

Figs. 15A to 15C are views for explaining an example of a display format of a display of the cellular phone shown in Fig. 12; and

20

Figs. 16A and 16B are views for explaining an example of a display format of a display of the cellular phone shown in Fig. 12.

Below, preferred embodiments will be described with reference to the accompanying drawings.

Below, a multipoint communication system according to an embodiment of the present invention will be  
5 explained.

Figure 1 is a view of the overall configuration of a multipoint communication system 1 of the present embodiment.

As shown in Fig. 1, in the multipoint communication  
10 system 1, for example, multipoint communication terminal apparatuses 5<sub>1</sub>, 5<sub>2</sub>, and 5<sub>3</sub> perform multipoint communication via a fixed telephone line network 2, an IP (Internet Protocol) network 3, and a cellular phone line network 4. Note that the number of multipoint  
15 communication terminal apparatuses for multipoint communication may be any as far as it is two or more and that the type of line network etc. connected to the multipoint communication terminal apparatuses is not specifically limited.

20 The IP network 3 is connected to an ASP (Application Service Provider) 7 and an MCU (Multipoint Control Unit) 8 via a gateway 6. Also, the ASP 7 and the MCU 8 are connected to a charging unit 9.

Here, the ASP 7 and MCU 8 correspond to a control  
25 means of a communication control apparatus and a

communication system of the present invention.

Also, the charging unit 9 corresponds to a charging means of the communication control apparatus of the present invention.

5       Also, the fixed telephone line network 2 is connected to the IP network 3 via an access point 10<sub>1</sub>, while the cellular phone line network 4 is connected to the IP network 3 via an access point 10<sub>2</sub>.

10       Also, the multipoint communication terminal apparatus 5<sub>1</sub> is, for example, connected to the fixed telephone line network 2 via a personal computer 14 at home.

15       Also, the multipoint communication terminal apparatuses 5<sub>2</sub> and 5<sub>3</sub> are connected to a gateway mobile exchange 11 of the cellular phone line network 4 via cellular phones 13<sub>1</sub> and 13<sub>2</sub> and a mobile exchange 12.

First, the main characteristics of a multipoint communication system 1 will be explained.

20       In the multipoint communication system 1, functions of the MCU 8 enable, for example, multipoint communication between the multipoint communication terminal apparatuses 5<sub>1</sub>, 5<sub>2</sub>, and 5<sub>3</sub>.

25       At this time, signals (video and sound) from the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub> are collected at the MCU 8 and combined there to a

signals to be reproduced by the multipoint communication terminal apparatuses. At this time, it is sufficient that MCU 8 perform processing and control so that the multipoint communication terminal apparatuses can obtain the output of the combined signals. Processing for generating combined signals to be finally output may also be performed in the multipoint communication terminal apparatuses.

At this time, for example, video signals of faces of users etc. transmitted by other multipoint communication terminal apparatuses and a content signal like a commercial provided by the ASP 7 etc. are transmitted to the multipoint communication terminal apparatuses.

Below, main components of the multipoint communication system 1 will be explained.

(Multipoint Communication Terminal Apparatuses  $5_1$  to  $5_3$ )

Figure 2 is a view of the appearance of the front of the multipoint communication terminal apparatuses  $5_1$  to  $5_3$ , while Fig. 3 is a view of the configuration of the multipoint communication terminal apparatuses  $5_1$  to  $5_3$ .

As shown in Fig. 2, the front side of each of the multipoint communication terminal apparatuses  $5_1$  to  $5_3$  is provided with an antenna 48, a display 49, speakers 51R and 51L placed on the two sides of the display 49,

cameras 52<sub>1</sub> and 52<sub>2</sub> placed above the display 49 in the figure, and a microphone 50 placed below the display 49 in the figure.

Here, the camera 52<sub>1</sub> is a camera for picking up an  
5 image of a view of a direction of the perspective of the user of each of the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub>, and corresponds to a second image pickup means of the present invention.

Further, the camera 52<sub>2</sub> is a camera for picking up  
10 an image of the face of the user of each of the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub>, and corresponds to a first image pickup means of the present invention.

The antenna 48 transmits and receives a signal to  
15 and from a personal computer 14 in the case of the multipoint communication terminal apparatus 5<sub>1</sub> shown in Fig. 1.

Also, the antenna 48 transmits and receives signals to and from cellular phones 13<sub>1</sub> and 13<sub>2</sub> in the case of  
20 the multipoint communication terminal apparatuses 5<sub>2</sub> and 5<sub>3</sub> shown in Fig. 1.

Also, as shown in Fig. 3, each of the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub>, comprises a receiving unit 53, a signal processing unit 54, a display  
25 49, a microphone 50, speakers 51L and 51R, cameras 52<sub>1</sub>

and 52<sub>2</sub>, and a transmission unit 55.

Here, the receiving unit 53, signal processing unit 54, and display 49 correspond to a receiving means, signal processing means, and display means of a  
5 communication apparatus of the present invention.

The receiving unit 53 performs demodulation, decoding, and error correction of a signal received by the antenna 48 in accordance with need and outputs a signal obtained thereby to the signal processing unit 54.

10 The signal processing unit 54 separates a signal input from the receiving unit 53 to, for example, an image signal and a sound signal and outputs the image signal to the display 49 and the sound signal to the speakers 51L and 51R.

15 Also, the signal processing unit 54 converts image signals input from the cameras 52<sub>1</sub> and 52<sub>2</sub> and sound signals input from the microphone 50 to a signal having a predetermined format for transmission and outputs it to the transmission unit 55.

20 The transmission unit 55 performs predetermined processing such as modulation on the signal input from the signal processing unit in accordance with need and outputs a signal obtained thereby to the antenna 48.

The display 49 of each of the multipoint  
25 communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub>, for example,



displays images of faces of users participating in the multipoint communication, images of a common commercial, etc.

At this time, a user of the one of the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>n</sub>, having a predetermined selection right can designate whether or not to display a commercial on the display 49, the type of the commercial when displaying it, etc.

Below, an explanation will be made of the processing for selection of the common content performed in a multipoint communication terminal apparatus when displaying an image of a commercial or other common content on the displays 49 of the plurality of multipoint communication terminal apparatuses participating in the multipoint communication.

Note that the processing described below is generally controlled by the signal processing unit 54 of the multipoint communication terminal apparatus shown in Fig. 3.

Figure 4 is a flow chart for explaining the processing.

Step ST1: The multipoint communication terminal apparatus 5<sub>1</sub> shown in Fig. 1 outputs a request for hosting multipoint communication, whereby multipoint communication is performed among the multipoint

communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub>.

Step ST2: The user of the multipoint communication terminal apparatus 5<sub>1</sub> which outputs the request for hosting the multipoint communication uses the multipoint communication terminal apparatus 5<sub>1</sub> to select common content to be displayed on the displays 49 of the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub> participating in the multipoint communication.

Step ST3: The multipoint communication terminal apparatus 5<sub>1</sub> judges whether the common content selected at step ST2 is one provided by itself. It executes the processing of step ST4 when judging that it is provided by itself, while transmits information to specify the common content to the MCU 8 shown in Fig. 1 when judging that it is not.

Step ST4: The multipoint communication terminal apparatus 5<sub>1</sub> transmits a content signal of the content selected at step ST2 to the MCU 8.

Step ST5: The multipoint communication terminal apparatus 5<sub>1</sub> to 5<sub>3</sub> perform multipoint communication under control by the MCU 8. At this time, the multipoint communication terminal apparatus 5<sub>1</sub> to 5<sub>3</sub> receives signals transmitted by the other of the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub> participating in the multipoint communication and a content signal of

the content selected at step ST2.

Step ST6: The multipoint communication terminal apparatus 5<sub>1</sub> to 5<sub>3</sub> judges whether or not it has received a predetermined request regarding selection of content in accordance with an instruction by a user. The routine proceeds to step ST7 when it judges it is received, while returns to the processing at step ST5 when not.

Step ST7: The multipoint communication terminal apparatus 5<sub>1</sub> to 5<sub>3</sub> judges whether or not the request received at step ST6 requests to shift the right of selection of content. The routine proceeds to the processing at step ST8 when it judges it does, while proceeds to the processing at step ST9 when it judges it does not.

Step ST8: The multipoint communication terminal apparatus 5<sub>1</sub> to 5<sub>3</sub> transmits a request for shifting the selection right specifying the user designated by the request received at step ST7 to the MCU 8 shown in Fig. 1.

Step ST9: The multipoint communication terminal apparatus 5<sub>1</sub> to 5<sub>3</sub> judges whether or not the request received at step ST6 is a request for selecting content. The routine returns to step ST2 when it is, while returns to step ST5 when it is not.

The ASP 7 transmits a commercial and content data of a topical image, news program, movie, a predetermined live program, etc. to be provided to the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub> to the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub> via the personal computers 14, cellular phones 13<sub>1</sub> and 13<sub>2</sub>, etc. of users participating in the multipoint communication via the MCU 8 or directly.

(MCU 8)

10 There are mainly two functions in the MCU 8.

As shown in Fig. 5, one is that of a multipoint controller (MC) 70 for controlling multipoint communication terminal apparatuses to participate in the multipoint communication, while the other is that of a multipoint processor (MP) 71 for combining signals collected from the plurality of multipoint communication terminal apparatuses for the multipoint communication terminal apparatuses in accordance with control by the MC.

20 Also, the multipoint controller 70 transmits, for example, an image of a common commercial provided by the ASP 7 to the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub> in accordance with instructions (selection) from the multipoint communication terminal apparatus 5<sub>1</sub> to 5<sub>3</sub>.

Also, the multipoint controller 70 provides content of a common image and sound for discussion to all of the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub> participating in the multipoint communication in accordance with a request from a user.

At this time, the multipoint controller 70 performs processing for setting the selection right for selecting the content, control for transmitting a content signal of a selected content to the multipoint communication terminal apparatuses, processing for changing the selection right, etc.

Figure 6 is a flow chart of the processing.

Step ST11: The multipoint controller 70 inquires about participation in multipoint communication to designated multipoint communication terminal apparatuses in accordance with a request for hosting multipoint communication from a multipoint communication terminal apparatus of one user and starts multipoint communication among multipoint communication terminal apparatuses of users responding that they will participate in the multipoint communication.

In the present embodiment, for example, the multipoint communication terminal apparatus 5<sub>1</sub> shown in Fig. 1 issues a request for hosting multipoint communication and multipoint communication is performed

among the multipoint communication terminal apparatuses  
5<sub>1</sub> to 5<sub>3</sub>.

Step ST12: As an initial setting, the multipoint  
controller 70, for example, sets the selection right for  
5 selecting the above common content at the multipoint  
communication terminal apparatus 5<sub>1</sub> which outputs a  
request for hosting the multipoint communication at step  
ST11.

At this time, the multipoint controller 70 controls  
10 communication so that the display 49 of the multipoint  
communication terminal apparatus 5<sub>1</sub> set with the  
selection right displays a display pattern indicating  
that it has the selection right. At this time, the  
multipoint controller 70 may control communication so  
15 that all displays 49 of the multipoint communication  
terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub> display the display pattern  
indicating that the multipoint communication terminal  
apparatus 5<sub>1</sub> has the selection right.

Step ST13: The multipoint controller 70 judges  
20 whether or not it has received a selection request for  
selecting the above common image from the multipoint  
communication terminal apparatus 5<sub>1</sub> set with the  
selection right. The routine proceeds to the processing  
at step ST14 when it judges that the selection request  
25 was received, while proceeds to processing at step ST15

when it judges it was not.

Step ST14: The multipoint controller 70 outputs a predetermined instruction to the ASP 7 and receives from the ASP 7 a content signal of the content specified by  
5 the selection request received at step ST13.

Step ST15: The multipoint controller 70 controls the multipoint processor 71 so as to combine the signals received from the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub> participating in the multipoint  
10 communication and the content signal input from the ASP 7 at step ST14 for the multipoint communication terminal apparatuses.

Step ST16: The multipoint controller 70 judges whether or not it has received a request from any of the  
15 multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub>. The routine proceeds to the processing of step ST17 when it judges it has received a request, while returns to processing at step ST15 when it judges it has not.

Step ST17: The multipoint controller 70 judges  
20 whether or not the request received at step ST 16 is a request for changing content. The routine returns to the processing at step ST14 when it judges it is a request for changing the content, while performs the processing at step ST18 when it judges it is not.

25 Step ST18: the multipoint controller 70 judges

whether or not the request received at step ST16 is a request for changing the selection right. The routine returns to the processing at step ST12 when it judges it is a request for changing the selection right, while  
5 performs the processing at step ST15 when it is not.

(Charging Unit 9)

The charging unit 9 performs processing for charging the users of the multipoint communication terminal apparatuses for the service of the multipoint  
10 communication provided by the MCU 8.

In the charging processing, the charging unit 9 performs processing for suitably reducing the fee charged to the users for the multipoint communication service for example when the ASP 7 provides advertising information  
15 to the multipoint communication terminal apparatuses.

Also, the charging unit 9 performs processing for charging persons requesting the advertising information when the ASP 7 provides advertising information to the multipoint communication terminal apparatuses.

20 Below, a variety of displays of the display 49 of the multipoint communication terminal apparatus 5<sub>1</sub> shown in Fig. 2 will be explained.

Note that the displays 49 of the multipoint communication terminal apparatuses 5<sub>2</sub> and 5<sub>3</sub> can also  
25 display the same displays as the multipoint communication



terminal apparatus 5<sub>1</sub>.

Also, the images displayed on the displays 49 of the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub> and the arrangement of the images on the displays 49 are generally controlled by the MCU 8 shown in Fig. 1.

Figure 7 gives views for explaining the case of displaying images of a commercial and faces of other parties of the multipoint communication on the display 49 of the multipoint communication terminal apparatus 5<sub>1</sub>.

In the example shown in Fig. 7A, when the multipoint communication terminal apparatus 5<sub>1</sub> is communicating, for example, with the multipoint communication terminal apparatus 5<sub>2</sub>, an image 100<sub>1</sub> of a face of the user of the other party picked up by the camera 52 of the multipoint communication terminal apparatus 52 and an image 101<sub>1</sub> of a commercial provided by the ASP 7 are displayed on the display 49 of the multipoint communication terminal apparatus 5<sub>1</sub>.

At this time, the commercial image 101<sub>1</sub> is displayed below the image 100<sub>1</sub> of the other party's face on the display 49. The image 100<sub>1</sub> and the image 101<sub>1</sub> are substantially the same size.

In an example shown in Fig. 7B, for example, when the multipoint communication terminal apparatus 5<sub>1</sub> is engaged in multipoint communication with four other

multipoint communication terminal apparatuses, images  
100<sub>2</sub> of other four users picked up by the cameras 52<sub>2</sub> of  
the other multipoint communication terminal apparatuses  
and the commercial image 101<sub>1</sub> provided by the ASP 7 are  
5 displayed on the display 49 of the multipoint  
communication terminal apparatus 5<sub>1</sub>.

At this time, the commercial image 101<sub>1</sub> is displayed  
below the images 100<sub>2</sub> of the faces of the four other  
parties on the display 49. Also, the image 101<sub>1</sub> is larger  
10 than the images 100<sub>2</sub> of the users' faces.

Note that an image of the user's own face may also  
be displayed on the display 49 of the multipoint  
communication terminal apparatus 5<sub>1</sub>.

In an example shown in Fig. 7C, for example, when  
15 the multipoint communication terminal apparatus 5<sub>1</sub> is  
engaged in multipoint communication with 10 other  
multipoint communication terminal apparatuses, images  
100<sub>3</sub> of the faces of the 10 users as other parties picked  
up by the cameras 52<sub>2</sub> of the other multipoint  
20 communication terminal apparatuses and the commercial  
image 101<sub>1</sub> provided by the ASP 7 are displayed on the  
display 49 of the multipoint communication terminal  
apparatus 5<sub>1</sub>.

At this time, the commercial image 101<sub>1</sub> is displayed  
25 below the images 100<sub>3</sub> of the other 10 users' faces on the

display 49.

In an example shown in Fig. 7D, for example, when the multipoint communication terminal apparatus 5<sub>1</sub> is engaged in multipoint communication with five other multipoint communication terminal apparatuses, images 100<sub>4</sub> of faces of five users of other parties picked up by the cameras 52<sub>2</sub> of the other multipoint communication terminal apparatuses and a commercial image 101<sub>2</sub> provided by the ASP 7 are displayed on the display 49 of the multipoint communication terminal apparatus 5<sub>1</sub>.

At this time, the images 100<sub>4</sub> of the users' faces and the commercial image 101<sub>2</sub> are the same size and are arranged in a matrix on the display 49.

Figure 8 gives views for explaining the case of displaying an image of faces of other parties in the multipoint communication and a topical image on the display 49.

In an example shown in Fig. 8A, when the multipoint communication terminal apparatus 5<sub>1</sub> is engaged in multipoint communication with multipoint communication terminal apparatuses 5<sub>2</sub> and 5<sub>3</sub>, images 100<sub>5</sub> of faces of users as other parties picked up by the cameras 52<sub>2</sub> of the multipoint communication terminal apparatuses 5<sub>2</sub> and 5<sub>3</sub> and a topical image 102 provided by the ASP 7 are displayed on the display 49 of the multipoint

communication terminal apparatus 5<sub>1</sub>.

At this time, the images 100<sub>s</sub> of the other parties' faces are displayed below the topical image 102 on the display 49.

5       The topical image 102 is, for example, an image transmitted by any one of the multipoint communication terminal apparatuses participating in the multipoint communication or an image of a content provided by the ASP 7 shown in Fig. 1, etc.

10       In an example shown in Fig. 8B, as the topical image 102 shown in Fig. 8A, for example, an image 103<sub>1</sub> from the user's perspective picked up by the camera 52<sub>1</sub> of the multipoint communication terminal apparatus 5<sub>1</sub> or 5<sub>2</sub> participating in the multipoint communication is used.

15       The user of the multipoint communication terminal apparatus 5<sub>1</sub> can converse while viewing the image 103<sub>1</sub> of the result of the image picked up from the perspective of the user of the multipoint communication terminal apparatus 5<sub>2</sub>.

20       In an example shown in Fig. 8C, when the multipoint communication terminal apparatus 5<sub>1</sub> is communicating, for example, with multipoint communication terminal apparatuses 5<sub>2</sub> and 5<sub>3</sub>, images 100<sub>s</sub> of faces of other parties picked up by the cameras 52<sub>s</sub> of the multipoint  
25       communication terminal apparatuses 5<sub>2</sub> and 5<sub>3</sub> and an image

104 displaying content of a conversation carried out in the multipoint communication in a text format are displayed on the display 49.

In this case, signals indicating the images picked up by the camera 52<sub>1</sub> and the camera 52<sub>2</sub> of the four multipoint communication terminal apparatuses including the multipoint communication terminal apparatus 5<sub>1</sub> are transmitted from the multipoint communication terminal apparatuses to the MCU 8, where the signals are controlled so as to be displayed in correspondence on one screen on the display 49 as shown in Fig. 8D.

In the above display format of the display 49 of the communication terminal apparatus 5<sub>1</sub>, the case of displaying faces of the communication parties is illustrated, but as shown in Fig. 9 and Fig. 10, a display format not displaying the faces of other communication parties on the display 49 is also possible.

In this case, the images displayed on the display 49 are provided, for example, by the ASP 7 shown in Fig. 1.

In an example shown in Fig. 9A, the commercial image 101<sub>1</sub> and an image 105 of a news program are displayed on the display 49 of the multipoint communication terminal apparatus 5<sub>1</sub>.

In an example shown in Fig. 9B, the commercial image 101<sub>1</sub> and a movie image 106 are displayed on the display

49.

In an example shown in Fig. 9C, the commercial image 101<sub>1</sub> and an image 107 of a live program of sports etc. are displayed on the display 49 of the multipoint communication terminal apparatus 5<sub>1</sub>.

In an example shown in Fig. 9D, the commercial image 101<sub>1</sub> and, for example, an image 108 of a private content provided by a multipoint communication terminal apparatus are displayed.

In an example shown in Fig. 10A, a commercial image 110, a news image 113, and images 111 of indexes of the news are displayed on the display 49 of the multipoint communication terminal apparatus 5<sub>1</sub>.

In an example shown in Fig. 10B, the commercial image 110, a movie image 114, and images 112 of highlights of the movie are displayed on the display 49 of the multipoint communication terminal apparatus 5<sub>1</sub>.

In an example shown in Fig. 10C, the commercial image 110, an image of a live program of sports etc., and images 112 of highlights of the live program are displayed on the display 49 of the multipoint communication terminal apparatus 5<sub>1</sub>.

Below, examples of operation of the multipoint communication system 1 will be explained.

For example, the multipoint communication terminal

apparatus  $5_1$  shown in Fig. 1 transmits a request for hosting multipoint communication designating the multipoint communication terminal apparatuses  $5_2$  and  $5_3$  as the participants to the MCU 8 via the personal computer 14.

When receiving the request for hosting multipoint communication, the MCU 8 inquires to the multipoint communication terminal apparatuses  $5_2$  and  $5_3$  for their participation.

When receiving responses of participation from the multipoint communication terminal apparatuses  $5_2$  and  $5_3$ , the MCU 8 controls communication for multipoint communication among the multipoint communication terminal apparatuses  $5_1$  to  $5_3$ .

As a result, for example, signals of images of faces of the users of the multipoint communication terminal apparatuses  $5_1$  to  $5_3$  are transmitted from the MCU 8.

Also, for example, when the MCU 8 receives an instruction requesting provision of a commercials from the multipoint communication terminal apparatus  $5_1$  having a selection right for selecting a common content, the MCU 8 outputs an instruction to the ASP 7, for example, to output a signal of an image of a commercial of a type designated by the request.

Then, the MCU 8 generates a signal obtained by

combining images of users' faces received from the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub>, and a commercial image input from the ASP 7 or a signal for generating an image combined in the multipoint communication terminal apparatuses and transmits the signal to the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub>.

At this time, the MCU 8 also transmits a combined signal of sound signals received from the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub>, to the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub>.

The multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub> display images of the other users' faces and a commercial image on the displays 49. The users converse while viewing the images.

At this time, the charging unit 9 reduces the fee charged for the multipoint communication to the multipoint communication terminal apparatuses 5<sub>1</sub> to 5<sub>3</sub>, receiving the provision of the commercial.

As explained above, according to the multipoint communication system 1, a common commercial can be displayed on the displays 49 of all of the users' multipoint communication terminal apparatuses by selection by a user. Thus, there is a high possibility that users participating in the multipoint communication



will make the same commercial as the topic of the conversation when viewing it, so the effects of the commercial can be improved.

Also, according to the multipoint communication system 1, it is possible to select whether or not to display a commercial on the displays 49 of the multipoint communication terminal apparatuses. When selecting to display a commercial, fees charged to the users for the multipoint communication can be reduced. Also, a service provider of the multipoint communication system 1 can obtain advertising fees from commercial clients.

Also, according to the multipoint communication system 1, by enabling the users to select what kind of commercial to be displayed on the display 49, it is possible to provide a commercial which suits the tastes of the users and the effects of the commercial can be improved.

Also, according to the multipoint communication system 1, by enabling a shift of the selection right, any user participating in the multipoint communication can select a commercial which he or she is interested in.

Also, according to the multipoint communication system 1, by displaying topical common content on the displays 49 of the multipoint communication terminal apparatuses, conversation among a plurality of persons

can become closer to actual face-to-face conversation. As  
a result, conversation conducted via multipoint  
communication can be stimulated and added value can be  
given to the multipoint communication service. Also, the  
5 amount of information conveyed via the multipoint  
communication can be made larger. This contributes to  
development of the information industry.

#### Second Embodiment

In the above embodiment, a case where multipoint  
10 communication terminal apparatuses, not personal  
computers and cellular phones, were provided was  
described as an example, but personal computers and  
cellular phones may have the functions of the multipoint  
communication terminal apparatuses explained in the above  
15 embodiment. Note that in the present embodiment, a case  
where cellular phones are given the above functions of  
the multipoint communication terminal apparatuses will be  
explained.

Also, in the present embodiment, a case where a  
20 plurality of MCUs are provided will be explained.

Figure 11 is a view of the configuration of a  
multipoint communication system 201 of the present  
embodiment.

As shown in Fig. 11, in the multipoint communication  
25 system 201, an ASP 207 is connected to an IMT-2000 line

network 203 via a gateway 206.

Also, a gateway mobile exchange 211<sub>1</sub> of the IMT-2000 line network 203 is connected to a mobile exchange 212<sub>1</sub>. The mobile exchange 212<sub>1</sub> is connected to the MCU 208<sub>1</sub> and  
5 communicates with cellular phones 205<sub>1</sub> and 205<sub>2</sub>.

Also, the gateway mobile exchange 211<sub>2</sub> of the IMT-2000 line network 203 is connected to a mobile exchange 212<sub>2</sub>. The mobile exchange 212<sub>2</sub> is connected to the MCU 208<sub>2</sub> and communicates, for example, with a cellular phone  
10 205<sub>3</sub>.

Also, the IMT-2000 line network 203 is connected to an MCU 208<sub>2</sub> via a mobile exchange 212<sub>2</sub>. The MCU 208<sub>2</sub> communicates with a cellular phone 205<sub>3</sub>.

In the multipoint communication system 201, the  
15 functions of the ASP 207 and the MCU 208<sub>1</sub> to 208<sub>3</sub> are basically the same as those of the ASP 7 and MCU 8 in the first embodiment.

Note that, when a cellular phone in their service range sends a request for hosting multipoint  
20 communication, the MCUs 208<sub>1</sub> to 208<sub>3</sub> becomes MCUs for generally controlling the multipoint communication.

Also, as a line network, for example, a cellular phone line network, IP network line network, etc. may be used other than the IMT-2000 line network 203.

25 The present embodiment has characteristics in a

display format and a method of selecting images of the cellular phones 205<sub>1</sub> to 205<sub>4</sub>.

Figure 12 is a view of the appearance of the front of the cellular phone 205<sub>1</sub>.

5        Note that the cellular phones 205<sub>2</sub> to 205<sub>4</sub> are the same as, for example, the cellular phone 205<sub>1</sub>.

As shown in Fig. 12, the cellular phone 205<sub>1</sub> comprises a display 249, operation buttons 250, an antenna 251, and cameras 252<sub>1</sub> and 252<sub>2</sub> placed above the  
10    display 249 in the figure and a selector 253 placed on the left side of the display 249 in the figure.

Here, the operation buttons 250, receiving unit 253, signal processing unit 254, and display 249 correspond to an operation means, receiving means, signal processing  
15    means, and display means of the communication apparatus of the present invention, respectively.

The display 249 is, for example, a liquid crystal display.

The operation buttons 250 comprise, for example, 15  
20    buttons arranged in a matrix of 3×5. Of these, 10 buttons form the 10-keys.

The camera 252<sub>1</sub> is a camera for picking up a view of a direction of a user's perspective of the cellular phone 205<sub>1</sub>.

25        The camera 252<sub>2</sub> is a camera for picking up, for

example, a face of the user of the cellular phone 205<sub>1</sub>.

The selector 253 is used for selecting an image to be displayed on the display 249 or selecting an image to be displayed enlarged among images displayed reduced on  
5 the display 249.

The cellular phone 205<sub>1</sub> also has a function of, for example, the cellular phone 13<sub>1</sub> and the multipoint communication terminal apparatus 5<sub>2</sub> in the above first embodiment. Namely, the cellular phone 13<sub>1</sub> has a function  
10 of a normal cellular phone and a function of displaying a variety of images as described in the above first embodiment.

The display 249 of the cellular phone 205<sub>1</sub> displays, for example, image blocks "1" to "6" arranged in a matrix  
15 of 2(vertical)×3(lateral) as shown in Fig. 13 in accordance with a signal received from the MCUs 208<sub>1</sub>, 208<sub>2</sub>, and 208<sub>3</sub> shown in Fig. 11.

Note that the MCUs 208<sub>1</sub> to 208<sub>3</sub> transmit to the cellular phone 205<sub>1</sub> display position instruction  
20 information about an arrangement of displaying the image blocks "1" to "6" on the display 249. The cellular phone 205<sub>1</sub> displays the image blocks "1" to "6" at predetermined positions in a matrix based on the display position instruction information.

25 The images displayed on the image blocks are moving

pictures, still pictures, etc.

At this time, numbers "1" to "6" indicating  
correspondence between the image blocks and the operation  
buttons 250 may be displayed as shown in Fig. 13B on the  
5 image blocks or not be displayed as shown in Figs. 13C  
and D.

In the example shown in Fig. 13C, "1" is indicated  
on the upper left of the image block "1". In the example  
shown in Fig. 13D, a semitransparent or opaque "1" is  
10 displayed so as to be superimposed on the image of the  
image block "1".

Figure 14A is an example of images displayed on the  
image blocks in the case shown in Fig. 13.

As shown in Fig. 14A, for example, an image of a  
15 mountain is displayed on the image block "1" displayed on  
the display 249. Also, a human face is displayed on the  
image block "2". A view of a house is displayed on the  
image block "3". A car is displayed on the image block  
"4". A baseball field is displayed on the image block  
20 "5". A view including a tree is displayed on the image  
block "6".

Here, the image blocks "1" to "6" are arranged in a  
matrix of 2(vertical)×3(lateral) so as to correspond to  
the arrangement of the numeric keys "1" to "6" shown in  
25 Fig. 12.

To select the image block "1" as the image to be enlarged among the image blocks "1" to "6" displayed on the display 249, the user views the number displayed at the upper left in the image blocks and presses the button "1" of the operation buttons 250.

As a result, as shown in Fig. 14A, the image block "1" is displayed enlarged on the display 249 of the multipoint communication terminal apparatus 5<sub>1</sub>.

Note that, when the button "1" of the operation buttons 250 is pressed, an image for enlarged display of the image block "1" or an image of a moving picture may be made requested from the cellular phone 205<sub>1</sub> to the MCUs 208<sub>1</sub> to 208<sub>3</sub>, shown in Fig. 11 and the cellular phone 205<sub>1</sub> may receive the corresponding image from the MCUs 208<sub>1</sub> to 208<sub>3</sub> for display.

Note that as a display format of the display 249 of the cellular phone 205<sub>1</sub>, for example, as shown in Fig. 15A, image blocks "1" to "9" may be displayed so as to correspond to the nine numeric keys "1" to "9" of the operation buttons 250 arranged in a matrix of 3×3.

Also, for example, as shown in Fig. 15B, image blocks "1" to "9", "\*", "0", and "#" may be displayed so as to correspond to 12 keys of the operation buttons 250 arranged in a matrix of 4(vertical)×3(lateral), that is, numeric keys "1" to "9", an operation button "\*", numeric

key "0", and operation button "#".

Also, for example, as shown in Fig. 15B, image blocks "a", "b", "c", "1" to "9", "\*", "0", and "#" may be displayed so as to correspond to 15 keys of the operation buttons 250 arranged in a matrix of 5(vertical)×3(lateral), that is, operation buttons "a", "b", "c", numeric keys "1" to "9", an operation button "\*", numeric key "0", and operation button "#".

In the above cases in Figs. 15A to 15C, a corresponding image block is displayed enlarged on the display 249 by pressing the corresponding operation button or numeric key.

Also, as shown in Fig. 16A, display patterns 300<sub>1</sub> to 300<sub>4</sub> each displaying, for example, a total of 9 image blocks arranged in a matrix of 3×3 may be displayed on the display 249. Image blocks "1" to "9" included in one display pattern selected therefrom may be displayed. Figure 16A shows a case where a display pattern 300<sub>2</sub> is selected.

To display an image block included in another display pattern on the display 249, the user operates the selector 253 to select a desired display pattern for display. As a result, image blocks "1" to "9" included in the selected display pattern are displayed on the display 249.



The selector 253 comprises, for example, a rotatable hemisphere. A user rotates the hemisphere with a finger etc. to position a predetermined pointer on the display patterns 300<sub>1</sub> to 300<sub>4</sub> to be selected and presses the  
5 hemisphere in that state a predetermined times with a finger etc. to select a display pattern.

Note that the display patterns 300<sub>1</sub> to 300<sub>4</sub> may be displayed on the display 249, for example, in an arrangement shown in Fig. 16B.

10 As explained above, according to the multipoint communication system 201, there are effects below in addition to the effects of the multipoint communication system 1 of the above first embodiment.

Namely, as explained with reference to Figs. 12 to  
15 16, by displaying a plurality of image blocks on the display 249 so as to correspond to the button arrangement of the operation buttons 250 and by displaying enlarged one image block by operating an operation button, the operation for selecting an image block becomes easy for  
20 users.

Note that in the above embodiments, the sound signal is an audio signal and includes music information and other acoustic information in addition to information of the human voice.

25 As explained above, according to the present

invention, there is provided a communication control apparatus, a communication apparatus, and a communication system friendly to users and a method for the same.

Also, according to the present invention, there is  
5 provided a communication control apparatus, a communication apparatus, and a communication system convenient for a service provider of multipoint communication in business and a method for the same.

While the invention has been described with  
10 reference to specific embodiment chosen for purpose of illustration, it should be apparent that numerous modifications could be made thereto by those skilled in the art without departing from the basic concept and scope of the invention.